Self-Extending Systems for Context-Aware Mobile Computing

Research Abstract

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The problem

How to develop software for contextaware mobile computing systems that can adapt to changing requirements at run time?

Challenges:

- inherent distribution
- changing set of available components
- different types of I/O hardware
- usability is paramount
- requirements elicitation is difficult
- ideas for new functionality come from experience in the field

Solution can address both:

- Adaptability at run time
- Rapid iterations during development

















Proposal: Self-extending systems

Architecture: *self-organizing services*

- Peer-to-peer services on mobile and stationary computers cooperate based their needs and abilities
- Supports mobility; integration of different hardware

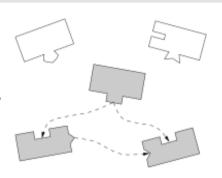
Middleware: dynamic contracts

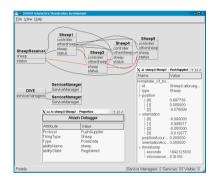
- Decentral reflective middleware maintains descriptions of services and negotiates dynamic contracts between them
- Allows context-aware self-organization according to users' desires and environmental change

Process: design at run time

- Developers can add new services to running system and test with existing services
- System gathers context information for user feedback

...New functionality will emerge that no single user or developer had anticipated.











Where am I now?

Timeline:

- Master's Thesis: April 2000 March 2001
- Ph.D. Thesis: October 2001 October 2004

Results to date:

- Concept of how to build self-extending systems
- DWARF: Distributed Wearable Augmented Reality Framework as test platform for these concepts
- Working middleware platform, several debugging and testing tools
- Six fairly large systems (6-60 developers each) built to date

What is still missing:

- Validation in industrial projects
- Detailed comparison with other approaches

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Thank You for Your Attention! Any Questions?

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